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10/773,796

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EXAMINER

PADGETT, MARIANNE L

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/773,796

Applicant(s)

VEERASAMY ET AL.

Examiner

Marianne L. Padgett

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-5, 7-11, 16-33 and 37-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-5, 7-11, 16-33 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 12/5/7.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/5/2007 has been entered.

Applicants' amendment to the specification of 12/5/2007, which amends the fifth column of table II, appears to be consistent with the surrounding disclosure in paragraphs [0101-102], thus is acceptable on a content basis, however the amendment is technically noncompliant with current amendment practice, since it is equivalent to only replacing one word in a paragraph, thus the appropriate way to amend table II would be to provide the amended table in the amendment specification. Please make this correction in the next response, so as to prevent possible future problems with printers.

2. Applicants' amendments to the claims have corrected the 112, second paragraph problems concerning the bias voltage with respect to claims 25, 27, 35 & 38, by positively claiming its use in the process, thus removing that rejection. Amendment of independent claim 31 to specify the recording media substrate, is a magnetic recording media substrate has corrected that 112, first paragraph issue, as has the amendment of claim 29 to be consistent with the G-peak values in column 4 of table II on page 27 of the specification.

The amendments to claims 26 & 37 have corrected substantial 112, first issues as previously presented, however, they have introduced a new scope issue & pointed out some clarity issues, as discussed below. The examiner notes that the apparent intent of these claims, which provide further description of the "substantially uniform weight distribution" introduced in the independent claims, as supported by paragraphs [0060-64, particularly 63] & [0068] of the original specification, is that the ion stream has a dominant ion species, all members of which having same number of carbon atoms in the ion. For **acetylene gas source** in the taught & claimed pressure range, that dominant species is C_2 (e.g. $C_2H_2^+$

ion and other **hydrocarbon ions** having 2 carbon atoms), which shows how all the ions in the dominant C_2 species, which only differ by charge & number of hydrogen atoms, demonstrate what is a substantially uniform weight distribution, with any of the nondominant species in this example required to have insubstantial contributions, i.e. each non-dominant ion species can comprise no more than about 5% of the ions in the stream, since for the acetylene gas source the next most abundant species, C_4 , which in the context of the disclosure would be **hydrocarbon ions** having 4 carbon atoms, thus a significantly different weight, which would make the ions' weight distribution nonuniform, if they were considered a significant amount, especially considering the teachings of [0068]. Note in the context of these claims, the ion stream cannot contain a significant amount, i.e. >5%, of any ion outside of approximately the weight of an acetylene ion plus or minus a hydrogen or two, so N^+ from the optionally taught N_2 or NF_3 or other nitrogen feed stocks [0063] could be in the plasma beam, but no significant amounts of N_2^+ , or H^+ , Ar^+ , Ne^+ , etc., which have significantly different weights contrary to the claimed distribution.

3. Claims 26-27, 30, 37-38 & 40 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicants have amended claims 26 & 37 to require "the source material **comprises** acetylene" (emphasis added), however the supported disclosure for the claimed distribution was only for plasma beam produced from **acetylene source gas**, not for some mixture that can contain any other gas along with the acetylene, i.e. other carbon sources (CH_4 , C_4H_8 ,...), inert gases, etc., especially considering the teaching in [0062] that "Acetylene may be unique among hydrocarbons in having a well defined reaction path", thus strongly suggesting that achieving such a claim distribution would be improbable if any other carbon source gases were mixed with the acetylene, however the claims as written allow any other carbon source gas to be mixed in any amount, an option which is clearly not supported by the specification. Nor

does the specification support mixing any other gases, **then** getting this specific distribution. It is noted that the teaching at the end of paragraph [0063], which provides for the optional inclusion of nitrogen feedstocks in order to produce nitrogenated films, suggests that the process would **work effectively** in combination with such nitrogen feed stocks, however it does **not** indicate that the **same species distribution** would be **present** when also using nitrogen feed stocks, and clearly one of ordinary skill in the art would not expect them to be present considering that if one is producing a nitrogenated film, one must have a significant concentration of nitrogen, which would have been expected to therefore be a more dominant species than the next most significant ion species of C_4 when only acetylene is the source gas.

Additionally, it is noted that the claimed phrasing of "dominant C_2 species of carbon ion and non-dominant species of C_4 carbon ion" is inaccurate with respect to the teachings of [0063], hence could be considered to include new matter & be misleading to one who reads it, since these species are not individual carbon ions as could be implied as written. Accurate language consistent with the original specification could be -- dominant C_2 species of hydrocarbon ion and non-dominant C_4 species of hydrocarbon ion --.

In view of applicants' citations & arguments concerning their deposited carbon providing "a plasmon peak greater than about 25 eV", further review of the specification indicates that they do not have support for the claimed range, as this range was not found in the original claims, nor is it provided for in table II, which has six specific values for plasmon peak, the lowest of which is 25.5 eV & the highest of which is 31.4 eV, thus does not support the infinitely large range claimed. It is noted that ion energies, such as 100 eV carbon ions, used to form the deposit are not relevant, as they're measuring a different quantity & the only higher value found higher than those provided in the table is from paragraph [0103], which gives the value of 34 eV as that of diamond's plasmon peak, however applicants do not disclose deposition of diamond, but of amorphous carbon or diamondlike amorphous carbon films, thus no support was found for values above 31.4 eV, let alone for infinitely high values of the plasmon peak,

thus the claimed range encompasses **new matter**. As 25 eV is lower than the lowest disclosed 25.5 eV, with about including even lower values, the support for the lower end of the claimed range is also questionable.

For these reasons these claims as amended are considered to encompass **New Matter**.

4. With respect to the term "subplantation", the examiner notes applicants' reference (page 8 of 12/5/2007 response) to page 1293 in the *Physical Review Letters* publication by Lipshitz et al. for clarification of meaning, where the first full paragraph on that page provides an adequate discussion of meaning & scope of this term, with it appearing that the term "subplantation" has been suggested as a name for a process that encompasses both some surface deposition + implantation, such that the process produces shallow narrow distribution profiles & sharp interfaces, thus is a subset of ion implantation that is combined with surface deposition.

5. Claims 30 & 40 remain rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

With respect to this rejection, applicants have again cited sections of the specification previously studied by the examiner, which no more tell her how to compare these values of plasmon peak energies to properties, such as density & sp^3 content of carbon films, for cases where plasmon values have not been measured than they did before. The examiner further notes that applicants have neither confirmed nor denied that the examiner should consider that "any DLC or hard carbon a-C:H may be considered to be expected to provide plasmon values [a]s claimed" (see below). Given that the examiner sees no clear manner in which to relate the plasmon peak values to the more commonly supplied density & C-C sp^3 content values, and the PTO does not have means to provide plasmon peak measurements, this appears to be the only criteria the examiner can apply to the claimed values. Should applicants confirm

that this is a reasonable assumption/means of evaluation, that will provide file wrapper estoppel, then the rejection can be dropped, as it will be if any explanation that actually provides means of evaluation is provided.

As previously noted, with respect to the claimed "plasmon peak" about >25 eV of claims 30 & 40, applicants' have cited a section of the specification previously cited & reviewed by the examiner. The examiner appreciated the emphasis of [0103], which compares the plasmon-peak value of 34 eV to the density of diamond, however this is only **one point** of comparison. While the examiner might assume that the lower eV values represent a-C:H films less dense than diamond, this is only an assumption, not a fact, nor has she any way of determining (assuming the assumption is correct), how much less dense 25 eV represents in comparison to the structure of diamond (is the relationship with density, linear, logarithmic, or what?), hence how it relates to the density measurements of various DLC films, thus it remains impossible for the examiner to determine how these values compare with densities produced in the prior art deposits, as sufficient information to do so is lacking. Lacking any clearly determinable correspondence or evidence to the contrary, any DLC or hard carbon a-C:H may be considered to be expected to provide plasmon values as claimed.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of

each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 3-5, 16-17, 20, 23-24, 29-30 & 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baldwin et al. (5,616,179), previously discussed in sections 12, 8, 7 & 7 of the actions mailed 3/29/2005, 11/16/2005, 7/21/06 (7/6/06) & 9/6/2007, respectively.

To reiterate, Baldwin et al. (5,616,179) teach an end-Hall ion source, with a straight path from source to substrate (figures 1 & 2), the teachings therein (some cited by applicant on page 9 of their 6/1/2006 response) on col. 3, line 65-col. 4, line 12 and col. 6, lines 31- 52, indicate that most species emitted by the end-Hall ion source will traverse the distance from the source to the substrate, without making any gas phase collisions involving subsequent energy loss. While it is indicated on col. 6 that **when methane** gas is used, all the ion species are not carbon containing and some H^+ & H_2^+ will be produced, as seen on col. 4, lines 13-23, methane is **not** the only hydrocarbon contemplated for use by Baldwin et al., **but alternate hydrocarbons**, such as **acetylene** are also contemplated. From Baldwin et al.'s comments, it appears expected that "all the ion current was assumed to be **carbon containing**"

(emphasis added) for such alternatives, thus would **inherently have a narrower & more uniform ion species distribution** when using taught gases, such as **acetylene**, due to compositional & energetic considerations, such as its inherent well-defined reaction path. Note that Baldwin et al.'s teachings when discussing most species emitted from their ion source that are arriving at the substrate, are including neutral species, nonionized radicals, etc., as being important to the formation of their a-C:H deposition, however applicants' claims while **limiting parameters** concerning the **ions** in the stream from the plasma, do **not exclude** the presence of these neutral species, etc., since they are not ions, but may come from a plasma. While Baldwin et al. indicates that the various neutral species are important in the formation of the deposit, the teachings **also indicate** that the **positive ion hydrocarbon species** are also **important**, hence they must be said to promote the formation of the taught a-C:H deposition (as well as DLC (abstract)), which is the material being deposited. Applicants' claims do not prohibit or exclude other influences from contributing to the formation of the claimed sp^3 C-C bonds, they merely require energizing the **ions** to form a stream, where "the substantially uniform **impact** energy distribution and the substantially uniform weight distributions **promote** formation" thereof (or the like; emphasis added), which the process of Baldwin et al. also unquestionably does. It would appear from the teachings of Baldwin et al. that when hydrocarbons, such as the taught **acetylene**, which can be assumed to **have all ion species being carbon-containing** as taught, that they would **correspond** to a **substantially uniform weight distribution** as claimed and would be affecting, hence promoting formation of sp^3 carbon-carbon bonds. Note: col. 1, line 62-col. 2, line 17 discussing the presence of sp^3 in deposits & col. 2, lines 66-67+ stating "A primary object of the present invention is to provide a process for depositing diamondlike carbon films...", where the examiner takes notice that by definition DLC films will have percentages of sp^3 C-C bonds as claimed.

(Note the mentioned "broad beam" irradiation previously cited by applicants in column 9, is an optionally supplied ion source using Ar + N₂, that is not the carbon ion source & used in an alternate mode process, hence is not relevant to the discussion.)

With respect to Baldwin et al.'s important feature of "2. The ranging energy distribution of the hydrocarbon-based positive ions in the beam", this statement does not tell what is meant by "ranging energy distribution", hence must be read in light of the rest of the disclosure in the patent, such as col. 4, line 53 that states "the ion beam energy is **about 100 eV**" (emphasis added), or col. 5, lines 17-34 teaching "it is believed that when the **average energy per deposition carbon atom is about 100 eV**, then hard, substantially optical transparent electrically resistive and non-electron-emissive a-C:H is produced. When the average energy per deposited carbon atom is **about 50 eV**, then softer...a-C:H is produced.... One reason that V_{anode} values must be higher than expected is that there is a **particular range** of ion energies produced at any given V and that there are low energy, reacted neutral species present as well..." (emphasis added), hence it is apparent from these teachings that by choosing a **particular energy** in a range of energies for the positive ions one produces a-C:H depositions with different hardnesses, i.e. different sp³ carbon-carbon bond percentages, where these **energy distributions centered** around the exemplary 100 eV energies for the deposited carbon atoms, i.e. impact energies, **clearly are promoting** the claimed bond structures and appear to be **sufficiently uniform within the context claimed**, with clear teachings concerning use of energy to achieve different hardness properties, especially considering discussions of using like precursors & like peak energy values as discussed by applicants to produce the hard a-C:H films. Note at taught energies, **ion implanting** mechanisms would have been expected to be involved during the **coating** process, especially as the thickness of the coating increased, such that there is ion mixing at the interface, along with the coating, hence this appears consistent with applicants' claimed subplantation.

With respect to the specifically claimed width of the energy distribution being "approximately 5% of a bias voltage", it is noted that average energy is related to Baldwin et al.'s V_{anode} , hence may be considered related to some sort of bias voltage, although the percentage cannot be determined from the given information, & cannot be measured by the PTO, however given taught use of anode voltages (i.e. \equiv bias voltages) to control film properties with the use of energies suggestive of those claimed & used with the suggested acetylene as the source gas, like energy distributions would have been expected, as acetylene has a limited number of ion species that would be produced, thus available to be accelerated by their charge with respect to the anode voltage & defined by that voltage. With respect to the claim of "a dominant species of carbon ion and a non-dominant species of carbon ion", there will inherently be in any plasma, species that have higher percentages (i.e. can be called dominant species) and those with lower percentages, and at least some or one of the carbon ion species of Baldwin et al.'s plasmas, such as those employing the suggested acetylene, would reasonably have been expected to be at or below 5%. Note that the "comprises" language does not limit how many dominate & non-dominant species are present, such that these claims are not considered to distinguish over Baldwin et al, especially considering that only the ion species present in the stream are being limited & defined.

Applicants' point (page 9 of 6/1/2006 response) about Baldwin et al.'s use of hydrogen to prevent formation of graphite like carbon bonds, is not considered to effect the relevance of the Baldwin et al. reference, because applicants' claims do not exclude the use of hydrogen or the effects thereof taught in Baldwin et al., particularly noting applicants' paragraph [0016], which includes the presence of hydrogen in the ion stream or the deposited coating. Furthermore, Baldwin et al. has input of hydrogen gas into the chamber (not into the ion source) for their use in preventing graphite-like chemical bonds (col. 9, lines 53-56), thus is not affecting the emissions from the ion stream, hence is neither included nor excluded by applicants' claim language.

While Baldwin et al. does not teach a particular percentage of sp^3 carbon-carbon bonds in their deposits, they do teach that a-C:H deposits contain sp^3 hybridization (col. 1, lines 58-col. 2, line 17, especially 5-10), and means of using the ion energy to effect the hardness, which one of ordinary skill in the art would recognize is affecting the percentage of sp^3 hybridization. Therefore, it would have been obvious to one of ordinary skill in the art to adjust their average ion energy in order to produce the hardness desired for the particular end use, where higher energies that are said to produce the harder films would have been expected to have had higher percentages of sp^3 hybridization, where routine experimentation would determine the energy to promote the desired degree of hardness/percentage of sp^3 hybridization, and thus would have been expected to encompass claimed values.

Note that Baldwin et al. teach that deposition rate (col. 5, lines 5-13) varies with distance between source and substrate providing examples above a deposition rate of 2000 Å/min (= 33 Å/sec) at a few centimeters distance with 500 Å/min (≈ 8.3 Å/sec).

As Baldwin et al. provide no spectra, i.e. no Raman spectra, or any other spectra, the examiner cannot directly evaluate whether or not peaks, as in claims 29-30 & 39-40, are or would be produced, however as [0102] in the specification appears to indicate that a Raman spectra G-peak is related to the percentage of C-C sp^3 content of the film, it appears that G-peaks in the claimed range of 1490-1510 cm^{-1} would have been expected to be present **due to the presence of taught sp^3 hybridization** as discussed above, especially considering discussions of producing hard a-C:H or DLC films, which necessitate the presence of the bond structures apparently required to create these peaks. The plasmon peak is discussed in the same paragraph, however the examiner cannot determine from the information given, exactly how it relates to density of the deposit, however given the taught DLC & hard a-C:H films deposited, it would appear that they would have been expected to significantly encompass densities, which probably, as near as can be determined from the lack of information on the meaning of the plasmon peaks, correspond to plasmon values as claimed.

8. Claims 19, 31-35 & 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baldwin et al. as applied to claims 3-5, 16-17, 20, 23-24, 29-30 & 37-38 above, and further in view of Rabalais et al. (5,374,318, previously discussed in sections 8-11 & 8 & 8 of the action mailed 3/29/2005 & 7/21/06 & 9/6/07, respectively).

While Baldwin et al. discusses desirable hard coating & optical properties of their diamondlike carbon deposits, they do not teach coating on a magnetic recording media, however as previously discussed, the secondary reference of Rabalais et al. discusses the usefulness of such carbon deposits for optical coatings or protective coatings on magnetic recording media, etc. (col. 1, lines 19-48), thus motivating the specifically claimed enduse, as Rabalais et al. shows the desirability of properties as are produced in Baldwin et al. used on such substrates.

9. Lewin et al. (4486286) remains of interest for use of a remote plasma, with a weak magnetic field perpendicular to the beam direction, where the plasma is form from acetylene gas (or other hydrocarbon gases, with preferably high carbon to hydrogen ratios), and where a plasma beam is formed via the use of an anode + grid structure to apparently extract ions, but the teachings therein provide little enlightenment concerning ion energy and ion weight distributions, however it is generally noted that higher energies increase hardness of coating.

10. Claims 7-11, 18 & 21-22 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 6-15 of copending Application No. 11/463,579 (= 2007/0098980 A1). Although the conflicting claims are not identical, they are not patentably distinct from each other, because while not claimed in the same order or claim, all aspects of the present claims are included in the copending claims of the (579) application, except in present dependent claim 18 directed to deposition rate, which parameter would have been expected to follow from the process & be an obvious variation thereof, determinable by routine experimentation. The copending application claims 6+7+13 contain all the limitations of the present independent claims 7, with

the additional limitation describing a particular range of diamondlike amorphous structure in the deposit, which is totally encompassed by the present claims, which are of a broader scope, thus inclusive of this narrower scope of the copending claim 6, which may be considered an obvious variation thereof.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

11. Claims 3-4, 17, 23-33, 35 & 37-40 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 21-30 of copending Application No. 11/463,577 (2006/0288938 A1). Although the conflicting claims are not identical, they are not patentably distinct from each other because these are directed to processes claimed with overlapping scope, where they limitations are presented in different orders, but may be considered obvious variations, providing that one considers that the unclearly claimed limitation concerning the bias voltages relationship to the ion energy would have made it obvious to one of ordinary skill in the art to employ biasing in the presently claimed process. Note that other variations in parameters or results are inclusive of overlapping scopes & determinable via routine experimentation as obvious variations on a theme. Note that while the copending application claims do not specify any particular type of substrate, the preamble limitation of independent claim 31 to deposit on recording media, is so broad as to encompass any material on which information can be recorded, which is essentially any solid material, thus lacking in any particular significance & considered a further obvious variation.

Claims 5, 16 & 20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 21-30 of copending Application No. 11/463,577 (2006/0288938 A1), in view of Baldwin et al. (discussed above).

These dependent claims differ from copending claims of application (577) by requiring the use a particular source material acetylene or specification of particular range of the ion energies, but as seen above both acetylene & energies inclusive of 100 eV are known for use in depositing DLC & hard carbon

a-C: H films via analogous ion streams from plasma, hence given these teachings it would have been obvious to one of ordinary skill in the art to employ such source materials and parameters in the process as described in the copending application claims, with the expectation of producing claimed results.

Claims 19 & 34 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 21-30 of copending Application No. 11/463,577 (2006/0288938 A1), in view of Rabalais et al. ((318), discussed above).

These claims differ by being specifically directed to magnetic recording media, however as discussed above Rabalais et al. teaches that it is known to deposit films of analogous protective carbon coatings on magnetic recording material, hence it would have been obvious to one of ordinary skill in the art to deposit such films by any effective technique that would not have been expected to be damaging to the underlying substrate, where such techniques would have been expected to encompass processes as described in the copending application (577).

These are provisional obviousness-type double patenting rejections because the conflicting claims have not in fact been patented.

12. Applicant's arguments filed 6/18/2007 and discussed above have been fully considered but they are not persuasive.

With respect to the provisional obviousness double patenting (ODP) rejections, as all claims are not allowable at this time & while restrictions have been made, with the election of either product or apparatus claims, the method claims in this copending places while withdrawal, are still pending, hence must be maintained at this time. It is noted that independent claims 7 & its dependent claims 8-11, 18 & 21-22 are only rejected under provisional ODP over SN 11/463,579 & remain otherwise allowable.

With respect to the rejections based on Baldwin et al. (179), the examiner notes applicants' citation of col. 5, lines 55-56 & col. 6, lines 3-8 as their sole reason why Baldwin et al. teaches against applicants' claimed uniform impact energy distribution & substantially uniform weight distribution. The

examiner has re-reviewed the teachings of Baldwin et al. with respect to this generic statement of advantage, however found no other recitations with respect to the presence of any low[er] energy ions, but found more detailed description with respect low energy **reactive neutral species**, thus with all due consideration, the examiner must give more weight to the more detailed parts of Baldwin et al.'s disclosure, which provided the source of the various contributing components & described the lower energy component of the deposit that provides advantages to the deposition techniques as "...low energy, reactive neutral species... these low energy species reduced the average energy per carbon atom deposited..." (col. 5, lines 28-34), without any mention of ions as the low energy component (col. 6, lines 41-52 that discusses carbon[...neutral...species] deposited from over and above the carbon from the ion flux, & Baldwin et al.'s claims 29-32 that defined the ion energy with respect to the anode voltage, are also germane to the discussion of higher energy ions & lower energy neutral species), especially when one considers the reaction paths available with respect to Baldwin et al.'s suggested hydrocarbon source gas, acetylene, which would have been expected to be even more restricted due to its reaction paths, then their preferred & exemplified methane source. This would appear to be an appropriate assessment when reviewing the "best mode" discussion on columns 7-8, where the application of a single anode voltage does not appear to provide any means for producing an ion energy distribution containing both high energy ions & low energy ions, which applicants assert is required in Baldwin et al., but the "best mode" teaching would appear to be entirely consistent with ion energy supplied and defined by the anode voltage, with lower energy components being deposited coming from the neutralized activated species that are traveling with the ions in the Hall on ion source output, but are not themselves ions (hence are not excluded by applicants claim language), & as the neutralized species are not being accelerated due to their lack of charge, they would be at a lower energy. Can applicants provide any evidence on why the particularly defined ion energies with respect to the anode voltages would include both high & low energy components, as opposed to the more detailed descriptions breaking down of Hall ion source outputs as

being ion energies produced at a given voltage (high energy component) combined with low energy reactive **neutral** species (low energy component), especially when employing the suggested acetylene gas which would inherently have a narrower weight distribution of ions due to its inherent reaction paths than other hydrocarbon gases? Or would applicants have any support for eliminating the contribution of neutral (lower energy) species to the deposition, which would differentiate from Baldwin et al.'s technique as described in detail?

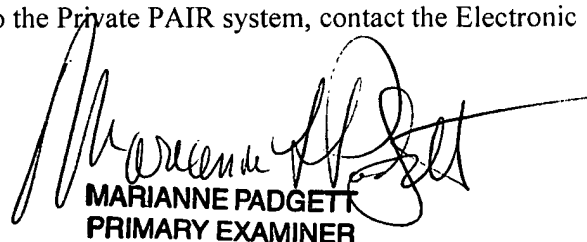
With respect applicant IDS of 12/5/2007, it is noted that the PCT document WO 88/10321 to Rabalais' et al. is a publication of PCT/US88/02225, which is the priority document of USPN 5,374,318 applied above & previously in this case. The Dorfman et al. (WO 96/41034) reference is of interest for making C-containing deposits with particle beam species have been "well-defined energy", however the reference provides no useful details on energy employs, such as distribution, etc.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on M-F from about 8:30 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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PRIMARY EXAMINER